

INVENTORS DESIGNATION SHEET

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TITLE: FOOTREST ASSEMBLY WITH MANUALLY RELEASABLE
COUPLING

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FOOTREST ASSEMBLY WITH MANUALLY RELEASABLE COUPLING

RELATED APPLICATIONS

[0001] The application is based on and claims benefit of United States Provisional Application No. 60/421,879, filed on October 28, 2002, entitled Footrest with Locking Mechanism, to which a claim of priority is hereby made.

BACKGROUND OF THE INVENTION

[0002] The present invention relates to a wheelchair and more particularly to a footrest assembly for a wheelchair.

[0003] A typical wheelchair includes footrests for the patient. A footrest may be a platform or a similar structure attached to, for example, a portion of the frame of the wheelchair at a position below the seat. As the name conveys, when the patient is seated in the seat his feet rest on the footrests. Thus, the footrests provide comfort to the patient by allowing him to keep his feet off of or dangling above the floor.

[0004] Wheelchairs are available in many varieties. In one variety, the wheelchair is collapsible for easy storage when it is not in use. In such a variety, the footrests must be adapted so that they may be collapsed as well. Collapsible footrests are, however, often difficult to operate.

SUMMARY OF THE INVENTION

[0005] It is an object of the present invention to provide a footrest assembly for a wheelchair which can be readily removed manually without a need for tools.

[0006] A footrest according to the present invention includes a support body which may be attached to a wheelchair, and a footrest structure which is coupled to the support body by a manually releasable coupling.

[0007] The support body in a footrest assembly according to the present invention may be tubular and may include an open free end allowing access at least to a hollow space therein.

[0008] The footrest structure according to the present invention may include a footrest body having an insert guide attached thereto, the insert guide being receivable in the hollow space that is accessible through the open free end of the support body.

[0009] In a footrest assembly according to the first embodiment of the present invention, the footrest body is coupled to the support body by a manually releasable coupling which releasably couples the insert guide to the support body thereby coupling the footrest body to the support body. A footrest structure as used in a footrest assembly according to the present invention may further include a support arm attached to the footrest body. In the first embodiment of the present invention the support arm has a free end that bears against the support body for additional stability.

[0010] The manually releasable coupling in the first embodiment of the present invention is a spring loaded pin which is mounted over a hole in the support body. The hole in the support body registers with a corresponding hole in the insert guide such that when the insert guide is received in the hollow space at the end of the support body the pin extends through both holes to couple the support body to the insert guide.

[0011] In a footrest assembly according to the second embodiment of the present invention a manually releasable coupling is provided between the support arm of the footrest structure and the support body. The manually releasable coupling includes a first coupling block attached to the support body that includes a channel,

and a second coupling block attached to the support arm that includes a rail which is receivable in the channel of the first coupling block. The second coupling block further includes a stop member pivotally attached thereto. In a footrest assembly according to the second embodiment the stop member pivots to a position that allows the rail to be received in the channel and then once the stop member exits the channel it pivots to make contact with the first coupling block thereby coupling the footrest structure to the support body.

[0012] The preferred stop member in the second embodiment further includes a handle so that it may be manually pivoted to allow the rail to slide out of the channel so that the footrest assembly may be disassembled.

[0013] Furthermore, preferably in the second embodiment the rail includes at least one outwardly extending edge which engages a corresponding inwardly extending ledge of the channel to further stabilize the footrest assembly.

[0014] Other features and advantages of the present invention will become apparent from the following description of the invention which refers to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] Figure 1 shows an exploded perspective view of a footrest assembly according to the first embodiment of the present invention.

[0016] Figure 2 shows a plan view of a disassembled footrest assembly according to the first embodiment of the present invention.

[0017] Figure 3 shows a plan view of a footrest assembly according to the first embodiment of the present invention.

[0018] Figure 4 shows a perspective view of a footrest assembly according to the first embodiment of the present invention.

[0019] Figure 5 shows a disassembled footrest assembly according to the second embodiment of the present invention.

[0020] Figure 6 shows a first plan view of a partially assembled footrest assembly according to the second embodiment of the present invention.

[0021] Figure 7 shows a second plan view of a partially assembled footrest assembly according to the second embodiment of the present invention.

[0022] Figure 8 shows a plan view of a footrest assembly according to the second embodiment of the present invention.

[0023] Figure 9 shows a cross-sectional view of a portion of the footrest assembly according to the second embodiment of the present invention viewed along line 9-9 in Figure 8 looking in the direction of the arrows.

DETAILED DESCRIPTION OF THE DRAWINGS

[0024] Figure 1 shows an exploded view of a footrest assembly 10 with a coupling mechanism according to the first embodiment of the present invention. Footrest assembly 10 includes a footrest structure which according to the present invention is coupled to a support body 12 by a manually releasable coupling.

[0025] The support body 12 in the first embodiment of the present invention is preferably a tube which can be either adapted for attachment to a wheelchair or is part of the wheelchair frame, and is at least mechanically strong enough for supporting the footrest structure. For example, support body 12 may be a tube that is part of the wheelchair frame disposed on the side of the seat to extend downwardly at an angle of, example, ninety degrees.

[0026] The footrest structure in the first embodiment of the present invention includes footrest body 14 which may be a curved tubular structure, and support arm 28, which is attached to and may be integral with footrest body 14. For example, support arm 28 may be welded to footrest body 14. Footrest body 14 includes a free

end which is adapted to receive a conventional footrest platform (not shown) on which a patient's foot may rest. The footrest platform usually extends parallel to and resides below the seat and includes an adjustable tube which is received by the free end of footrest body 12. Typically, the adjustable tube can be slidably moved so that its height relative to the ground can be adjusted.

[0027] A footrest assembly according to the first embodiment of the present invention further includes insert guide 16. Insert guide 16 is attached to footrest body 14 by, for example, a fastener such as screw 32, and received by a free end of support body 12. Specifically, because support body 12 in the first embodiment is a tube, insert guide 16 is received at its hollow end. Insert guide 16 includes cavity 17, which registers with a corresponding hole 13 on support body 12 when insert guide 16 is received by the hollow end of support body 12. Once insert guide 16 is received in the hollow free end of support body 12, footrest body 14 is temporarily assembled in place and ready to be coupled to the same by a manually releasable coupling.

[0028] Once footrest body 14 is coupled to support body 12, brace support 18, which is disposed at the free end of support arm 28, bears against support body 12 to provide additional mechanical support and stability to footrest body 14. Brace support 18 is preferably formed from a compliant material such as a polymer.

[0029] The manually releasable coupling in the first embodiment of the present invention is a spring loaded pin 27 which extends through hole 13 on support body 12 to cavity 17 in insert guide 16, to prevent footrest body 14 from rotating relative to or being retracted away from support body 12. Specifically, the manually releasable coupling in the first embodiment of the present invention includes: pin 27, which may be a threaded shaft; standoff 22, which is attached to support body 12 by, for example, welding; spring 24; and end nut 20. Standoff 22 includes guide hole 23 which is positioned in substantial alignment with hole 13 on support body 12 when standoff 22 is secured in place. Optionally, release knob 26 may be attached to pin 27

to facilitate manual handling of pin 27. Spring 24 is fitted over pin 27 and disposed between release knob 26 and the upper portion of standoff 22. Pin 27 is received in guide hole 23 of standoff 22 and end nut 20 is threaded onto the free end of pin 27. The free end of pin 27, which receives end nut 20, is inserted into hole 13 of support body 12. The top end of spring 24 is attached to release knob 26, while the opposing bottom end of spring 24 is attached to the upper portion of standoff 22 in order to suspend pin 27 at a predetermined position such that end nut 20 is suspended in the interior of support body 12.

[0030] Referring to Figure 2, insert guide 16, which is fastened onto footrest body 14, is received by the free end of support body 12 nearest to hole 13 which displaces pin 27 by pressing against end nut 20 on its free end. Once insert guide 16 is fully inserted in support body 12, it is rotated either clockwise or counterclockwise until hole 17 on insert guide 16 registers with end nut 20 that is threaded to the free end of pin 27. Once end nut 20 is received by hole 17 on insert guide 16, footrest body 14 is coupled to support body 12. By manually pulling on release knob 26 end nut 20 can be pulled out of hole 17 of insert guide 16 which allows footrest body 14 to rotate clockwise or counterclockwise or be removed from locking tube 12.

[0031] Referring now to Figure 5 in which like features are identified with like numerals, a footrest assembly according to the second embodiment of the present invention includes all of the features of the first embodiment including a manually releasable coupling that couples a footrest structure to support body 12. In the second embodiment of the present invention, a manually releasable coupling is provided to couple support body 12 and support arm 28. It has been found that by positioning the manually releasable coupling between support body 12 and support arm 28 additional stability can be achieved.

[0032] The manually releasable coupling of the second embodiment of the present invention includes first coupling block 30 which is attached to support body

12 by, for example, fasteners such as screws 32, and second coupling block 34 which is preferably attached to the free end of support arm 28 by, for example, welding or some other suitable attachment mechanism. First coupling block 30 includes channel 31 which extends from the free end of first block 30 to a predetermined depth. Second coupling block 34 includes rail 33 which is slidably receivable in channel 31 of first coupling block 30.

[0033] The manually releasable coupling in the second embodiment further includes stop member 35 which is pivotally attached to second coupling block 34 by, for example, a pivot pin (not shown). Stop member 35 is adapted to freely pivot and includes handle 36 for manual manipulation. It should be noted that stop member 35 includes slanted contact surface 37 which, as will be described later, engages first coupling block 30 to cause stop member 35 to pivot.

[0034] In the preferred embodiment, first coupling block 30, second coupling block 34, and stop member 35 are made from a metal. It should be noted that other suitable materials may be used for forming first coupling block 30, second coupling block 34 and stop member 35 without deviating from the present invention.

[0035] Referring now to Figures 6-8, a footrest assembly according to the present invention is assembled by first aligning insert guide 16 with the free end of support body 12 so that insert guide 16 may be received by the hollow end thereof as described earlier with respect to the first embodiment of the present invention. As the footrest structure is moved toward support body 12, slanted contact surface 37 of stop member 35 engages first coupling block 30 and causes stop member 35 to pivot and swing upwardly.

[0036] Referring specifically now to Figure 7, as insert guide 16 is further moved within the hollow end of support body 12, rail 33 of second coupling block 34 is received in channel 31 of first coupling block 30 and slides therein until stop member 35 exits channel 31, and as shown in Figure 8, swings back to make contact

with first coupling block 30. As a result, the footrest structure cannot be moved in a direction that would allow insert guide 16 to be retracted from the hollow end of support body 12.

[0037] To allow the disassembly of footrest structure from support body 12, handle 36 may be moved toward support arm 28 thereby pivoting stop member 35 such that it may enter channel 31 of first coupling block 30 to allow the footrest structure to slide off of support body 12.

[0038] Referring now to Figure 9, in order to ensure that the footrest structure does not “swing off” of support body 12, rail 33 includes at least one outwardly extending edge 38 which engages a corresponding inwardly extending ledge 40 disposed inside of channel 31 of first coupling block 30. As a result, the footrest structure is restricted from moving in a direction transverse to the support body 12, thereby preventing the footrest from “swinging off” of the same.

[0039] Although the present invention has been described in relation to particular embodiments thereof, many other variations and modifications and other uses will become apparent to those skilled in the art. It is preferred, therefore, that the present invention be limited not by the specific disclosure herein, but only by the appended claims.